

## ABSTRACT

The present invention provides an SiGe-based thin film, a method for manufacturing this thin film, and applications of this thin film. The present invention relates to a method for producing, by sputtering, an SiGe-based semiconductor thin film to serve as a member of a thermoelectric transducing material component that is a constituent element of a sensor device whose signal source is a temperature differential and that transduces a local temperature differential into an electric signal, wherein the SiGe-based thin film is produced by heat treating a SiGe-based semiconductor thin film material after sputtering vaporization; to the above-mentioned method for forming a thin film wherein the substrate temperature and/or the plasma output is raised in the formation of the SiGe-based semiconductor thin film by sputtering vaporization, to form a thin film with a more highly crystallized structure; to an SiGe-based thin film produced by the above-mentioned method, which serves as a member of a thermoelectric transducing material component that is a constituent element of a sensor device whose signal source is a temperature differential and that transduces a local temperature differential into an electric signal, and which has been endowed with good

thermoelectric characteristics by heat treatment; and to a gas sensor device containing as a constituent element the above-mentioned SiGe-based thin film.